

Claims

5        1. Apparatus for unloading containers for rod-like articles, comprising a carrier for receiving a full container in a receiving position in a first orientation, and means for moving the carrier to an unloading position at which the carrier is in a second orientation, the moving means including means for translating the carrier and means for rotating the carrier.

10      2. Apparatus as claimed in claim 1, wherein the translating means and rotating means are independently controlled.

15      3. Apparatus as claimed in claim 1 or claim 2, wherein the translating means moves the carrier along a substantially linear path.

20      4. Apparatus as claimed in any preceding claim, wherein the receiving and unloading positions are substantially at the same level.

25      5. Apparatus as claimed in any preceding claim, wherein the rotating means is effective to rotate the carrier so that a container is rotated between said first and second orientations.

30      6. Apparatus as claimed in any preceding claim, wherein the translating means and rotating means are each reversible.

35      7. Apparatus as claimed in claim 6, further including transfer means for receiving an unloaded container from said carrier at a position intermediate said unloading position and said receiving position.

40      8. Apparatus as claimed in any preceding claim, wherein the carrier comprises a carriage slidable between said receiving and unloading positions and a rotatable carrier mounted on the carriage.

9. Apparatus as claimed in any preceding claim, wherein the position at which the translating means locates the carrier at the unloading position is determined by reference to a dimension of the container or its contents.

5 10. Apparatus as claimed in any preceding claim, wherein said translating means and rotating means are arranged such that initial movement of a container away from the receiving position includes both translational and rotational components.

10 11. Apparatus as claimed in any preceding claim, wherein at least one of said translating and said rotating means includes means for moving the carrier to a preferred position following a stoppage.

15 12. Apparatus as claimed in claim 11, wherein said carrier moving means includes means for interrogating at least one detector for the position of the carrier and for subsequently moving said carrier to a reference position in a direction determined by the results of said interrogation.

20 13. Apparatus for unloading containers of rod-like articles, comprising means for delivering a container to an unloading position at which articles are unloaded through an open end of the container, and means for conveying unloaded articles away from the unloading position along a path, wherein the conveying means extends substantially across said open end at said unloading position except at said path.

25 14. Apparatus as claimed in claim 13, wherein the extent of said path at said unloading position is substantially less than the extent of said open end, so that the conveying means extends across a substantial part of the width of said open end.

30 15. Apparatus as claimed in claim 13 or claim 14, wherein the container is so orientated at said unloading position that said open end and said conveying means extend substantially horizontally with said conveying means immediately below said open end.

16. Apparatus as claims in any of claims 13-15, including means for controlling articles in said path such that articles already unloaded in said path may be maintained at a level which is substantially the same as that of said conveying means.

5 17. Apparatus as claimed in any of claims 13-16, wherein the conveying means comprises endless band conveyor means.

18. Apparatus as claimed in claim 17, wherein the endless band conveyor means comprises opposed bands defining said path between confronting ends.

10 19. Apparatus for unloading containers of rod-like articles, comprising means for delivering a container to an unloading position, and means for conveying unloaded articles away from the unloading position, wherein the conveying means is driven at a first relatively high speed during a first phase during which a first, major part of the contents of a container is unloaded and at a second, lower speed during a second phase during which the remainder of the contents of a container is unloaded.

15 20. Apparatus as claimed in claim 19, wherein the transition between said first and second phases takes place dependent on a signal from detector means sensing the level of articles in or from an unloading container.

20 21. Apparatus as claimed in claim 19 or claim 20, wherein the conveying means includes first conveyor means immediately adjacent the unloading container and second conveyor means downstream of said first conveyor means for conveying away a multi-layer stream of articles.

25 22. Apparatus as claimed in claim 21, wherein the ratio of speeds of the first and second conveyor means differs in said first and second phases.

30 23. Apparatus as claimed in any of claims 19-22, wherein said first speed is variable and said second speed is fixed.

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24. Apparatus as claimed in claim 23, wherein said first speed is determined in accordance with signals derived from receiving means downstream of said conveying means.

5 25. Apparatus as claimed in any of claims 19-24, including further detector means for stopping the conveying means substantially when the contents of a container have been unloaded.

10 26. Apparatus as claimed in claim 25, wherein the further detector means comprises a level detector arranged in the path of unloading articles immediately downstream of the unloading position.

15 27. Apparatus as claimed in any of claims 19-26, including a variable capacity reservoir for receiving articles from said conveying means, including at least one sensor for detecting the relative capacity of the reservoir, further including means for controlling the conveying means in accordance with signals derived from the sensor.

20 28. Apparatus as claimed in any of claims 13-18, incorporating apparatus as claimed in any of claims 19-27.

29. Apparatus as claimed in any of claims 1-12, incorporating apparatus as claimed in any of claims 13-28.